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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/903,721	07/12/2001	Patrick J. Bohrer	AUS920010132US1 (9000/29)	9310
7590	11/03/2004			EXAMINER CHERY, MARDOCHEE
Frank C. Nicholas CARDINAL LAW GROUP Suite 2000 1603 Orrington Avenue Evanston, IL 60201			ART UNIT 2188	PAPER NUMBER
DATE MAILED: 11/03/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/903,721	BOHRER ET AL.
	Examiner Mardochee Chery	Art Unit 2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on _____.
2a) This action is **FINAL**. 2b) This action is non-final.
3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-21 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-21 is/are rejected.

7) Claim(s) 21 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) Notice of Informal Patent Application (PTO-152)
6) Other: _____

Application/Control Number: 09,903,721
Art Unit: 2188

DETAILED ACTION

1. Claims 1-21 are presented for examination.

Oath/Declaration

2. *The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. 1.63.*

Specification

3. The disclosure is objected to because of the following informalities: applicant discloses in the specification files which may meet or exceed a condition limit which may be determined based on usage factors but fails to define the condition limit and the criteria to meet or exceed that condition limit. On page 7, line 15 and 16 in the specification applicant discloses, "The controller may the process the copied first tier file (block 56)" Should be changed to –The controller may process the copied first tier file (block 56)--.

Appropriate correction is required.

Claim Objections

4. Claim 21 objected to because of the following informalities: In line 10, it appears that "means for determining whether a request fir a unit requires" should be changed to -- means for determining whether a request for a unit requires --.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 9, 10, 19, 20 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

6. As per claim 9 and 19, applicant discloses "a unit meeting or exceeding a condition limit" but fails to define the condition limit and the criteria to meet or exceed that condition limit.

7. As per claim 10 and 20, applicant discloses "the condition limit is determined based on usage factors" but does not set forth the requirements for the usage factors.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 2, 5, 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claims 2 and 12, applicant does not set forth why he would "copy the requested unit", "create the requested unit", and then "generate adequate space". It's not being disclosed why one would "create the requested unit" after it's been "copied" and why one would "generate adequate space" after the requested unit is being "copied" or "created".

As per claim 5 and 15, applicant discloses, "providing the first tier comprises assigning a portion of the disks to the first tier". It's not clear, whether it's a portion of at least one disk or disks, since the first tier can be of at least one disk.

Claims 3 and 4, 13 and 14, are rejected by virtue of their dependency on claims 2 and 12 respectively.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 1, 3, 6, 7, 9-12, 13, 16, 17, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nunnelley-Lewis, U.S. Patent 5,900,007, in view of Craig-Bernard, U.S Patent 5,790,176.

As per claim 1, 11 and 21, Nunnelley-Lewis discloses a method of operating a plurality of disks having units of storage allocation, [the system includes a large number of small files, and storage management subsystems "(storage managers)" for controlling power status of the disk files and the allocation of data to the disk files; col.2, lines 22-25]; powering on at least one first tier disk [The allocation manager passes the cluster list to the power manager, whose function is to make the clusters active so that the dataset can be stored. The power manager determines which physical disk files must be active to fulfill the storage request by referring to cluster map 114; col. 4, lines 19-23; clusters may be placed in an active mode when one or more of the storage managers determines that their use may be required; col.2, lines 37-39]; powering down the second tier [The storage managers minimize internal thermal loading and power consumption for the disk array by placing clusters in an inactive mode when not in use; col.2, lines 34-36]; determining whether a request for a unit requires processing on the first tier or second tier [One storage manager, known as an allocation manager, chooses the clusters upon which incoming data is written based on the current state of each cluster "(active or inactive)"; col.2, lines 39-42; power manager 106 determines which disk files must be activated to fulfill the request; col. 4, lines 43-45]; accessing the requested unit if the requested unit requires processing on the first tier [a third storage manager, known as an access manager, interprets incoming read requests, determines the cluster location of the stored data; col.2, lines 44-47; power manager 106 determines which disk files must be activated to fulfill the request; col. 4, lines 43-45]; powering on a second tier disk [The storage

managers minimize internal thermal loading and power consumption for the disk array by placing clusters in an inactive mode when not in use; col.2, lines 34-36] to copy the requested unit from the second tier disk to a first tier disk, if the requested unit is stored on the second tier [such that at any point in time some disk files are active and others are inactive , and further such that the disk files which are active are those determined to be the best suited to serving the read and write storage requests pending in the system; col.3, lines 48-52].

However, Nunnelley does not teach providing a first tier of at least one disk, the first tier storing at least one popular unit.

Craig-Bernard discloses once a feature is aged to a point of not having been requested within a predetermined time period, the Media Server removes the program from on-line storage units 278, 282 and 286 and places it in an archival storage 290 [Since Craig discloses the data storage device may include both optical and magnetic memories; removing the aged data from storage units 278, 282 and 286 and places it in an archival storage 290 guarantees that at least one popular unit is stored on storage units 278, 282, and 286 and therefore has the same effect as Bohrer's disclosure; Fig. 3B; col.9, lines 36-39].

As taught by Craig, removing the program from on-line storage units 278, 282 and 286 and places it in an archival storage 290 has the advantages of maximizing system resources while providing acceptable access time to the feature based on its demand history (col.9, lines 34-36).

Nunnelley does not teach providing a second tier of at least one disk, the second tier storing at least one unpopular unit.

By the system of Craig, since aged data are removed from storage units 278, 282 and 286 and placed in an archival storage 290, it is evident that archival storage 290 must have at least one aged data (unpopular unit).

It would have been obvious to one of ordinary skill in the art at the time the invention was made by applicant to utilize the teaching of Craig in the system of Nunnelley for the aforementioned advantages.

Accordingly, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

As per claim 11, Nunnelley discloses the claimed invention as detailed above in the previous paragraphs. However, Nunnelley does not teach computer usable medium including program code and storage allocation means as recited in the claims.

Shagam, (US 6,205,529), discloses *[program to send copy commands to the disk to cause the copy function in the logic controlling the disk to effectuate the data transfer col.3, lines 20-23] to provide finding or freeing up enough space (col.2, lines 23-25).*

Since the technology for implementing a storage device with computer usable medium including program code and storage allocation means was well known as evidenced by Shagam, and since computer usable medium including program code and storage allocation means provides finding or freeing up enough space, an artisan would have been motivated to implement a storage device with computer usable medium

including program code and storage allocation means because in the system of Nunnelley. Thus, it would have been obvious to one of ordinary skill in the art, at the time the invention was made by applicant, to modify the system of Nunnelley to include computer usable medium including program code and storage allocation means to provide finding or freeing up enough space (col.2, lines 23-25) as taught by Shagam.

As per claim 21, Nunnelley discloses the claimed invention as detailed above in the previous paragraphs. However, Nunnelley does not teach means for operating a plurality of disks having units of storage allocation as recited in the claims.

Craig discloses [means for distributing each program taken from a first memory type over a plurality of memory devices; col.21, lines 38-40; furthermore, all the limitations of claim 21 were addressed above in claims 1 and 11. Therefore it is obvious that the means for executing those operations are all incorporated in the method of claim 1 and the computer usable medium and computer program code of claim 11].

Claims 2, 5, 8, and 12, 15, 18, directly dependent on claim 1 and 11 respectively, are also rejected for the reasons stated above.

As per claims 2 and 12, Nunnelley discloses the claimed invention as detailed above in the previous paragraphs. However, Nunnelley does not teach determining if at least one first tier disk has adequate space to process a requested unit; copying the requested unit from the second tier disk to the first tier disk if at least one first tier disk

has adequate space; creating the requested unit on the first tier; and generating adequate space on the first tier.

Craig discloses determining if at least one first tier disk has adequate space to process a requested unit [if they are capable of storing the entirety of the program in a single memory device such as 521; Fig.5; col.18, lines1-2]; copying the requested unit from the second tier disk to the first tier disk if at least one first tier disk has adequate space [the content of the third type of memory device represented by 521...52N, can be fed directly into corresponding memory devices of the fourth type; Fig.5; col.17, lines65-67]; creating the requested unit on the first tier [Fig.5]; generating adequate space on the first tier [if they are capable of storing the entirety of the program in a single memory device such as 521; Fig.5; col.18, lines1-2].

Claims 3 and 13, directly dependent on claim 2 and 12 respectively, are also rejected for the reasons stated above.

As per claims 3 and 13, Craig discloses determining if a first tier unit has become unpopular [Feature Index System 252 performs catalog maintenance functions including input of new feature program data into the system, ageing, and deletion or archival of aged program data; Feature Index System 252 keeps track of the access frequency of the stored data; col.9, lines 11-15].

Craig further discloses transferring the unpopular first tier unit to a second tier disk [Once a feature is aged to a point of not having been requested within a

predetermined time period, the Media Server removes the program from on-line storage units 278, 282, and 286 and places it in archival storage 290; col.9, lines 36-39].

Claims 4 and 14, directly dependent on claim 3 and 13, respectively, are also rejected for the reasons stated above.

As per claims 4 and 14, Craig discloses determining if the unpopular unit has been modified, and transferring only modified unpopular first tier units to the second tier [*once a feature is aged to a point of not having been requested within a predetermined time period, the Media Server removes the program from on-line storage units 278,282 and 286 and places it in archival storage 290; Fig.5; col.9, lines 36-39; since the second tier disk has already stored the unpopular units from the first tier, it is obvious to transfer the unpopular first tier unit to the second tier only if it has been modified*].

As per claims 5 and 15, Craig discloses assigning a portion of the disks to the first tier [*portions of a single program contained in the first type of memory device, such as 501 are distributed over a plurality of different memory devices 511, 512, 513...51N of a second memory type; col.17, lines 20-23; the fact that portions of a program can be contained in the first type of memory device serves the purpose of assigning a portion of the disk to the file and therefore to the first tier*].

As per claims 6 and 16, Craig-Bernard discloses the first tier disks comprising high-performance hard drives [a memory array constituted by a plurality of memory types, each memory type having a different operating speed, said memory array comprising a plurality of memory devices of each said memory type, said plurality of memory types being arranged from a first to n'th level according to increasing operating speed; although the plurality of memory types may include DRAM, Magnetic Disk, high speed magnetic tape, and archival magnetic tape it would have been obvious to replace any of those media with the disks of Bohrer et al. since disks are now inexpensive and they have the capabilities for both reading and writing; col.21, lines 32-37].

As per claims 7 and 17, Craig-Bernard discloses the second tier disks comprise low-power hard drives [said plurality of memory types being arranged from a first to n'th level according to increasing operating speed; although the plurality of memory types may include DRAM, Magnetic Disk, high speed magnetic tape, and archival magnetic tape it would have been obvious to replace any of those media with a magnetic disk since magnetic disks are now inexpensive and they have the capabilities for both reading and writing; col.21, lines 32-37].

As per claims 8 and 18, Craig discloses the unit comprises at least one member selected from a group consisting of: a file, a portion of a file, a file system block, a combination of files, and a suitable subdivision of information [the resulting data stream is constituted using a data striping method in which portions of a single program contained in the first type memory device, such as 501, are distributed over a plurality of different memory devices 511,512,513...51N of a second memory type; col.17, lines 19-24].

Claim 10 and 20, directly dependent on claim 8 and 18, respectively, are also rejected for the reasons stated above.

As per claims 9 and 19, Craig discloses the popular unit comprises a unit meeting or exceeding a condition limit, and the unpopular unit comprises a unit not meeting the condition limit [Usage Probability Processor 262 statistically determines features having the highest probability of usage on a per hour and day of week basis to properly allocate high order storage; col.10, lines 21-24].

As per claims 10 and 20, Craig discloses the condition limit is determined based on usage factors [Usage Probability Processor 262 assigns a priority value to the feature which is used to determine the appropriate storage type to maximize system resources while providing acceptable access time to the feature based on its demand history; col.9, lines 32-36].

As per claims 12-20, Nunnelley discloses the claimed invention as detailed above in the previous paragraphs. However, Nunnelley does not teach the computer program code as recited in the claims. Furthermore, all the limitations of claim 12-20 were addressed above in claims 2-10. Therefore it is obvious that the computer program code disclosed by applicant for executing those operations is already incorporated in the methods of claim 2-10.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gentry et al.	5,568,629
Capozzi et al.	4,084,231
Kazuhiko et al.	0416968 A2
Taketa et al.	6,408,400 B2
Ukai et al.	5,809,516
Cordi et al.	3,737,881
Nizar Puthiya	US 6,442,698 B2

10. When responding to the office action, Applicant is advised to clearly point out the patentable novelty that he or she thinks the claims present in view of the state of the art disclosed by references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. 1.111(c).

11. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mardochee Chery whose telephone number is (571)272-4246. The examiner can normally be reached on 8:30A-5:00P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manonama Padmanabhan can be reached on (571)272-4210. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

10/07/2004

*Mano Padmanabhan
10/18/04*

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER

Mardochee Chery
Patent Examiner
October 7, 2004